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Chen(10) **Pub. No.: US 2002/0144196 A1**(43) **Pub. Date: Oct. 3, 2002**(54) **METHOD FOR TESTING A NON-VOLATILE MEMORY****Publication Classification**(75) **Inventor: Wei-Hsin Chen, Changhua (TW)**(51) **Int. Cl.⁷ G11C 29/00**(52) **U.S. Cl. 714/718**

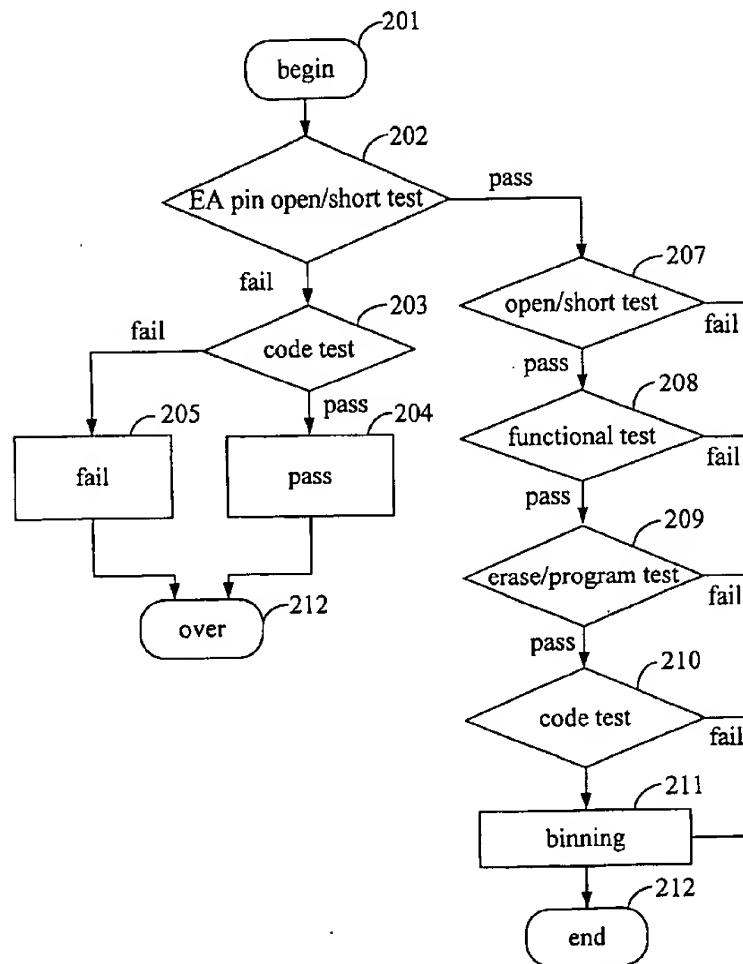
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(73) **Assignee: WINBOND ELECTRONICS CORPORATION**(57) **ABSTRACT**

The present invention discloses a method for testing a non-volatile memory, characterized in that the code assigned by the client is written in at least one non-volatile memory in advance, and then a particular pin of the non-volatile memory is cut, such as a write enabling pin for avoiding the mistake of rewriting. After restarting a testing machine, the code written in the non-volatile memory is read out to compare it with the code retrieved from a controlling program of the testing machine. If the comparing result is identical, it means that the code retrieved by the controlling program of the testing machine is correct; otherwise, the code retrieved by the controlling program is incorrect.

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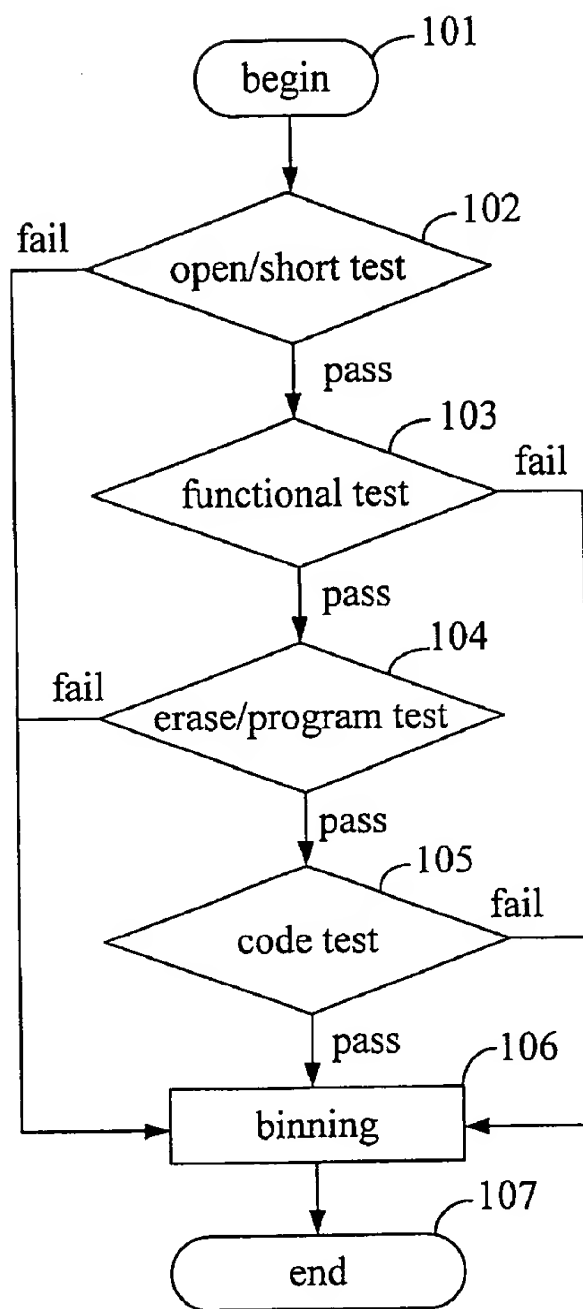


Fig. 1 (prior art)

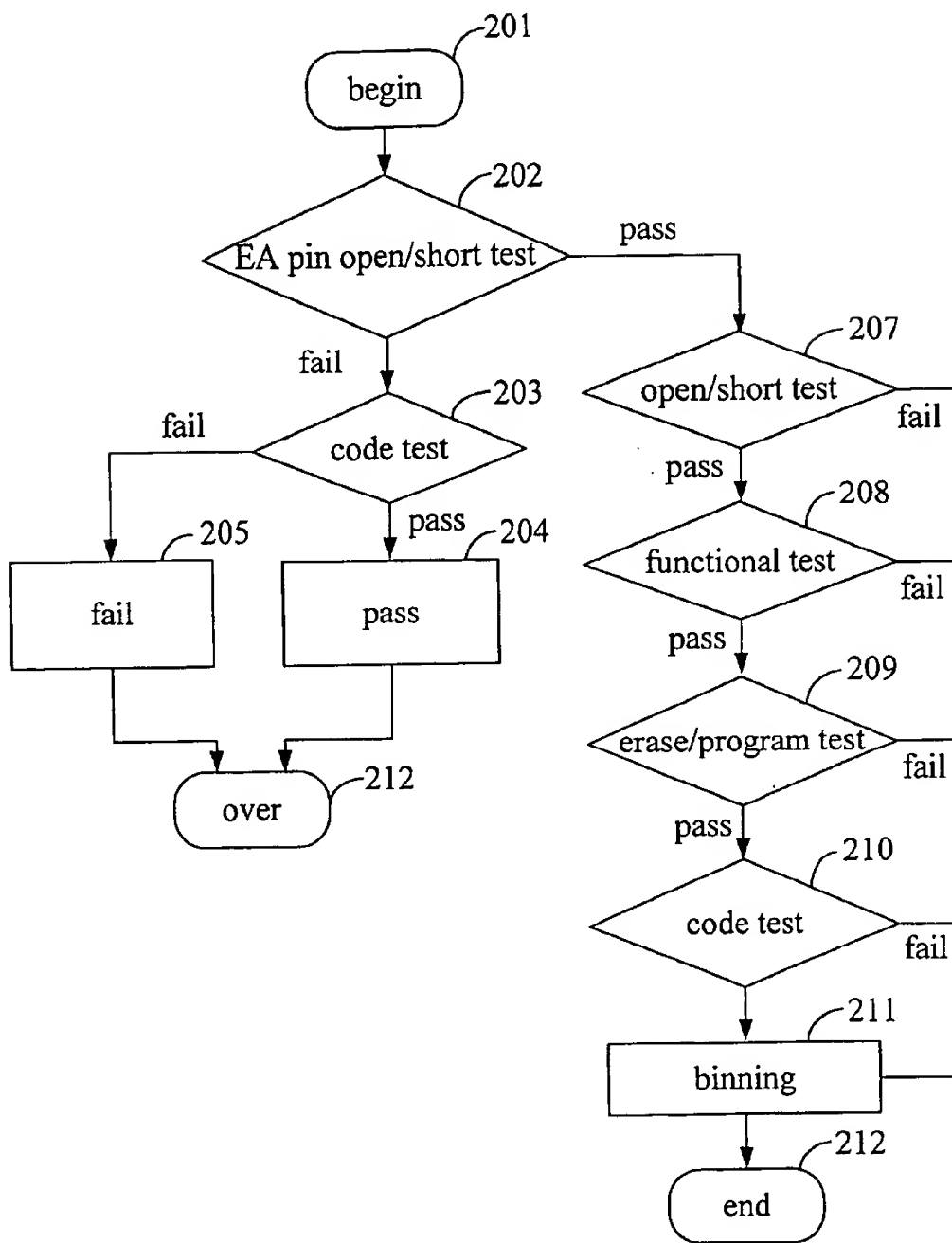


Fig. 2

METHOD FOR TESTING A NON-VOLATILE MEMORY

BACKGROUND OF THE INVENTION

[0001] 1. Field of the Invention

[0002] The present invention relates to a method for testing a non-volatile memory, and more particularly, to a method for testing whether the non-volatile memory is written with a code assigned by the client or not.

[0003] 2. Description of the Prior Art

[0004] To verify the validity of a non-volatile memory (such as a flash memory or an electrically erasable programmable ROM (EEPROM)), a series of testing procedures are performed before the non-volatile memory leaves the factory.

[0005] FIG. 1 depicts a flow chart of the conventional method for testing a non-volatile memory. In step 101, it depicts the beginning of the flow chart of the conventional testing method. In step 102, an open/short test of the pins of the non-volatile memory is executed, if it is affirmative, step 103 is proceeded; otherwise, step 106 is proceeded and the memory is binned to binning 2. In step 103, a functional test of the non-volatile memory is executed, if it is affirmative, step 104 is proceeded; otherwise, step 106 is proceeded with and the memory is binned to binning 3. In step 104, an erasable and programmable test of the non-volatile memory is executed to determine whether the data of the non-volatile memory can be erased and new data can be rewritten in the memory or not, if it is affirmative, step 105 is proceeded; otherwise, step 106 is proceeded and the memory is binned to binning 4. In step 105, a code test of the non-volatile memory is executed. In the code test, the code written in the non-volatile memory is read out and compared it with the original code. If the result is identical, step 106 is proceeded and the memory is binned to binning 1; otherwise the memory is binned to binning 5. All memory will be binned in step 106. In step 107, the flow chart of the conventional testing method ends.

[0006] In other words, the opening/shorting of the pins, logic function, erasable function and reading writing function of the memory can be checked in the conventional method, but it cannot be checked whether the code written in the memory is assigned by the client or not. For example, if the controlling program of the testing machine retrieves a code which is not assigned by the client, the result of the read write function test will be affirmative. Since the read write function test of the memory is to read out the code written in the memory and compare it with the code retrieved by the controlling program of the testing machine.

[0007] In accordance with the problem of prior art, the present invention discloses a method that can not only test the short/open of the pins, logic function, erasable function and read write function of the memory but also test whether the code written in the memory is assigned by the client or not.

SUMMARY OF THE INVENTION

[0008] An object of the present invention is to provide a method for testing the non-volatile memory which can execute not only open/short test of the pin, and logic

function test, erasable and programmable test of the memory and the readable and write function test of the code, but also can verify whether the code written in the non-volatile memory is assigned by the client or not.

[0009] Another object of the present invention is to provide a method for testing a non-volatile memory, which can test the code retrieved by the controlling program and the setting of the testing machine at the same time.

[0010] In order to achieve the above objects and to avoid the disadvantages of the prior art, the present invention discloses a method for testing a non-volatile memory, comprising the following steps:

[0011] (a) preparing a first type correlation sample and a second type correlation sample, wherein the first type correlation sample is a non-volatile memory with a code assigned by the client and a particular pin is cut, and the second type correlation sample is a non-volatile memory which has been verified;

[0012] (b) after restarting the testing machine, executing the open/short test of the particular pin of the first type correlation sample and the second type correlation sample, if the particular pin is short, proceeding to step (c); otherwise, proceeding to step (d);

[0013] (c) comparing the code of the first correlation sample with the code retrieved by the controlling program of the testing machine; if identical, the code retrieved by the controlling program is correct; otherwise, the code retrieved by the controlling program is incorrect; and

[0014] (d) executing the test for the second correlation sample, if identical, the setting of the testing machine is correct; otherwise, the setting of the machine is incorrect.

[0015] The present invention is characterized in that the code assigned by the client is written in at least one non-volatile memories in advance, and then a particular pin of those non-volatile memories is cut, such as a write enabling pin to avoid the mistake of rewriting. After restarting the testing machine, the code written in the non-volatile memory is read out to compare with the code retrieved by the controlling program of the testing machine. If the comparing result is identical, the code retrieved by the controlling program of the testing machine is correct; otherwise, the code retrieved by the controlling program is incorrect. Furthermore, the method of the present invention can test another non-volatile memory, which had been verified, after restarting the testing machine, if identical, the setting of the testing machine is correct; otherwise, the setting of the machine is incorrect.

[0016] The foregoing and other objects and advantages of the invention and the manner in which the same are accomplished will become clearer based on the following detailed description taken in conjunction with the accompanying drawings.